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MONTERY PINE DIE-BACK

A previous study was made of the die-back of Montery Pine from the point of view of plant pathology and no conclusive evidence was found.

This study was made with idea that the trouble might have been caused by one or more insects. To date this has not been determined. However, the work will be continued until a positive or negative conclusion has been reached.

The only insects discovered to date that are contributory to the death of the pines, either primarily or secondarily, are the Pityophthorus carmeli and P. nitidilus puncticollis. They bore their galleries about half way between the woody tissue and the bark in live material and lay their eggs in globular holes just off the main channels. However, in a tree that has died and is drying up, they burrow into the woody tissue completely below the bark. This may be to avoid dessication.

Most of the eggs are scattered irregularly along the branches and twig tips up to three or four feet back from the twig tip. Where there is a limb-whorl, there is usually a large group of eggs laid in close proximity to each other both above and below the secondary limbs or twigs.

The length of the various stages of metamorphism have not yet been definitely determined. They will be worked out carefully in a future study.

For the most part the Pityophthorus did not seem to do fatal damage. Their channels, for the most part, were longitudinal along the limbs and did not girdle them completely except in the final stages. However, along the full length of a limb, and in various localities, they may girdle the limb completely, even in the initial stages. This, of course, would cut off the food supply and cause the death of all parts beyond, and, if continued throughout the tree, would cause the death of that tree.

Some Hemiptera or Lepidoptera were suspected of having played a part in the death of the pines, but none were found.

Mites were also suspected. Numerous beetle mites were found under the tips of bark scales, but seemed to have no significance whatever. A few smaller, transparent, mites were found inside of the bark, but always in the Pityophthorus channels. They were never in any case found below the depths of the channels or independent from them.

These smaller mites are no doubt entirely parasitic upon the Pityophthorus, either their eggs, larva, pupa, or the live adults. In one instance, a P. carmeli was found that was about dead. It only moved its legs occasionally by kicking. Seven of the mites were swarming over him and some minute moving object was projecting from its abdomen, perhaps another one of the mites.

Very few Lasconotus pertenius were found on the bark and in the channels of the Pityophthorus. Most that were found were in the channels

They are also parasitic upon the Pityophthorus. Nemazoma attenuatum were also found in the channels, and are supposed to be parasitic. The parasitic species are small in number compared to that of the Pityophthorus and could not do much to hold them in check.

No other insect seemed to play even a minor part in the death of the trees. However, there were quite a number of species in the climax type after the tree had died and fallen. The most common of these were the flatheaded borer, Cossonus, Endomychus, Mycetaea, termites, and even sow bugs in the more opened spaces in the bark (between the bark and woody tissue).

In every tree that showed die-back concentric pitch rings were found, sometimes only one, in the initial stages, but often several in the more advanced stages. These may be the initial stages in the weakening of the trees to such an extent that insects can gain easy access. They are supposedly caused by some microscopic insect, a fungus or bacteria, but this is yet to be determined.

The most serious damage yet discovered was found on the roots of a fallen Pinus radiata. Many of the lateral roots were a solid mass of pitch in which no clear wood could be seen. This is assumed to be caused by the same organism that causes the pitch rings in the branches. Whatever the organism may be, it irritates the tree to such an extent that pitch is exhuded for protection.

This pitching was so extreme as to fill all of the conduction cells and cut off the transfering of mineral salts from the soil. It would also weaken the root system structurally, so that a tree would fall easily.

Intensive study needs to be done on this to determine the organism that is causing the irritation and then a method of control should be worked out.

Homer W. Marion

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